

SUPPORT FOR THE AMENDMENTS

Applicants have canceled Claims 1-7 and added new Claims 8-34 for clarity and to obviate the criticisms outlined on page 2 of the Official Action. Support for new Claims 8-34 can be found in Claims 1-7, as originally filed. Applicants expressly state on the record that the amendments of Claims 1-3 (rewritten as new Claims 8, 12, 21, and 26) are not narrowing and that these amendments were neither necessary nor made to distinguish the present claims from the prior art.

No new matter has been added. Claims 8-34 are active in this application.

REMARKS

At the outset, Applicants' representative wishes to Examiner Wong for the helpful and courteous discussion held with her on July 19, 2002, during which the prosecution of the above-identified application was materially advanced. The following remarks will expand and summarize the issues discussed.

Present Claims 8-21 relate to methods for producing cheese, which comprise:

(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture;

(2) coagulating said mixture with a milk coagulating enzyme, to obtain a second mixture comprising cheese curd and whey.

Present Claims 22-34 relate to methods for producing cheese, which comprise:

(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture;

(2) treating said first mixture with transglutaminase, to obtain a second mixture; and

(3) coagulating said second mixture with a milk coagulating enzyme, to obtain a mixture comprising cheese curd and whey.

The inventors have surprisingly found that the presently claimed methods exhibit an enhanced yield of cheese as compared to conventional methods for preparing cheese.

The cited references contain no disclosure or suggestion of such a method of preparing cheese. Moreover, these references contain no teaching which would suggest the improved yields afforded by the presently claimed methods. Accordingly, these references cannot affect the patentability of the present claims.

The rejection of Claims 1 and 2 under 35 U.S.C. § 102(b) in view of U.S. Patent No. 6,224,914 (Han et al) is respectfully traversed. Han et al discloses a process in which a milk product fortified with whey protein is first treated with transglutaminase, to effect cross-linking of the whey protein, and then added to another milk product for curding. Thus, what is added to the milk in the process in Han et al is a cross-linked product of whey protein, not a breakdown or decomposition product of whey protein.

In sharp contrast, the presently claimed methods involve adding a partial whey protein hydrolyzate to milk prior to coagulation. The partial whey protein hydrolyzate may be prepared by treating whey protein with a protease such as trypsin. Thus, what is added to the milk in the present invention is a partial breakdown or decomposition product of whey protein.

There is no disclosure of the presently claimed process in Han et al. Moreover, a key step of the presently claimed methods involves treating the whey protein in a way which is just the opposite to the way described in Han et al. Accordingly, this reference cannot make the present claims obvious.

For these reasons, the rejection is improper and should be withdrawn.

The rejection of Claim 1 under 35 U.S.C. § 102(e) in view of U.S. Patent No. 6,120,809 (Rhodes) is respectfully traversed. Rhodes discloses certain methods and apparatus useful for preparing cheese. However, as in the case of Han et al, Rhodes contains no disclosure of preparing cheese by a method which involves adding a partial whey protein hydrolyzate to milk prior to coagulation. Thus, the present claims are patentable over Rhodes for essentially the same reasons they are patentable over Han et al, and the rejection should be withdrawn.

The rejection of Claim 3 under 35 U.S.C. § 103(a) in view of Rhodes or Han et al in further view of Monti et al is respectfully traversed. As noted above, neither Rhodes nor Han et al disclose or suggest a method of making cheese which involves adding a partial whey protein hydrolyzate to milk prior to coagulation. Applicants submit that there is nothing in Monti et al which can cure the basic deficiencies of the primary references. Specifically, there is likewise no teaching in Monti et al which would suggest adding a partial whey protein hydrolyzate to milk prior to coagulation.

Moreover, there is nothing in the cited references, even in combination, which would suggest any advantage to be obtained by adding a partial whey protein hydrolyzate to milk prior to coagulation. In fact, it is the surprising discovery of the present inventors that the presently claimed methods for preparing cheese afford dramatic improvements in cheese yield.

In support of the assertion that the presently claimed methods result in dramatic improvements in cheese yield, the Examiner's attention is directed toward the results

presented in Table 1, on page 27, of the specification. For the Examiner's convenience, the results given in Table 1 are repeated below:

Test solution: milk (whey decomposed material/TG)	Curd dry material weight (g)	lactose in dry curd (g)	Protein increase (g)
(a) Milk (non-added/non-added)	1.0475	0.318	0 (0%)
(b) Milk (non-added/added)	1.0714	0.306	+0.036 (5%)
(c) Milk (added/non-added)	1.2554	0.360	+0.166 (23%)
(d) Milk (added/added)	1.4331	0.506	+0.198 (27%)

Inspection of the results presented in Table 1 shows that addition of the partial hydrolyzate of whey protein according to the present method, test solutions (c) and (d), afforded superior yields as compared to analogous test solutions in which the whey protein partial hydrolyzate was not added, test solutions (a) and (b). Applicants submit that there is no teaching in the cited references, even in combination, which would suggest the improved yields for the presently claimed methods, test solutions (c) and (d) in Table 1.

For all of these reasons, the rejection should be withdrawn.

The objection to Claims 4-7 under 37 C.F.R. § 1.75(c) has been obviated by appropriate amendment. As the Examiner will note, Claims 4-7 have been rewritten to remove all multiple dependencies. Accordingly, the objection is no longer tenable and should be withdrawn.

The rejection of Claims 1 and 3 under 35 U.S.C. § 112, second paragraph, has also been obviated by appropriate amendment. In this case, Claims 1 and 3 have been rewritten to

obviate the criticisms outlined on page 2 of the Official Action. Once again, the rejection is no longer tenable and should be withdrawn.

Applicants submit that the application is now in condition for allowance, and early notification of such action is earnestly solicited.

Respectfully submitted,

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IN THE CLAIMS

Please cancel Claims 1-7, without prejudice toward the further prosecution of these claims in a continuation and/or divisional application.

Please add the following new claims:

--8. (New) A method for producing cheese, comprising:

(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture;

(2) coagulating said mixture with a milk coagulating enzyme, to obtain a second mixture comprising cheese curd and whey.

9. (New) The method of Claim 8, further comprising:

(3) separating said cheese curd from said whey.

10. (New) The method of Claim 8, wherein said partial hydrolysate of milk whey protein is prepared by treating milk whey protein with a protein decomposing enzyme.

11. (New) The method of Claim 10, wherein said protein decomposing enzyme is selected from the group consisting of bromelain, neutrase, papain, and trypsin.

12. (New) The method of Claim 10, wherein said protein decomposing enzyme is trypsin.

13. (New) The method of Claim 8, wherein said partial hydrolysate of milk whey protein is mixed with said milk material in an amount of 2 to 20 wt% of said partial hydrolysate of milk whey protein, based on the total weight of said milk material.

14. (New) The method of Claim 8, wherein said partial hydrolysate of milk whey protein is mixed with said milk material in an amount of 5 to 10 wt% of said partial hydrolysate of milk whey protein, based on the total weight of said milk material.

15. (New) The method of Claim 8, wherein said partial hydrolysate of milk whey protein and said milk material are mixed in relative amounts of 2 to 1,600 parts by weight of said milk material and one part by weight of said partial hydrolysate of milk whey protein, based on the solid contents of said milk material and said partial hydrolysate of milk whey protein.

16. (New) The method of Claim 8, wherein said partial hydrolysate of milk whey protein and said milk material are mixed in relative amounts of 4 to 640 parts by weight of the said milk material and one part by weight of said partial hydrolysate of milk whey protein, based on the solid contents of said milk material and said partial hydrolysate of milk whey protein.

17. (New) The method of Claim 8, wherein said mixing said partial hydrolysate of milk whey protein with said milk material comprises:

(a) adding said partial hydrolysate of milk whey protein to said milk material, to obtain an initial mixture; and

(b) maintaining said initial mixture at a temperature of 2 to 15°C for 5 to 24 hours.

18. (New) The method of Claim 17, wherein said initial mixture is maintained at a temperature of 2 to 15°C for 12 to 16 hours.

19. (New) The method of Claim 8, wherein said mixing said partial hydrolysate of milk whey protein with said milk material is carried out by:

(a) adding said partial hydrolysate of milk whey protein to said milk material, to obtain an initial mixture;

(b) maintaining said initial mixture at a temperature of 2 to 15°C for 5 to 24 hours, to obtain an incubated mixture; and

(c) treating said incubated mixture with transglutaminase.

20. (New) The method of Claim 19, wherein said initial mixture is maintained at a temperature of 2 to 15°C for 12 to 16 hours

21. (New) The method of Claim 8, wherein said milk material is selected from the group consisting of whole milk, semi-skim milk, and skim milk.

22. (New) A method for producing cheese, comprising:

(1) mixing a partial hydrolysate of milk whey protein with a milk material, to obtain a first mixture;

(2) treating said first mixture with transglutaminase, to obtain a second mixture; and

(3) coagulating said second mixture with a milk coagulating enzyme, to obtain a mixture comprising cheese curd and whey.

23. (New) The method of Claim 22, further comprising:

(4) separating said cheese curd from said whey.

24. (New) The method of Claim 22, wherein said partial hydrolysate of milk whey protein is prepared by treating milk whey protein with a protein decomposing enzyme.

25. (New) The method of Claim 24, wherein said protein decomposing enzyme is selected from the group consisting of bromelain, neutrase, papain, and trypsin.

26. (New) The method of Claim 24, wherein said protein decomposing enzyme is trypsin.

27. (New) The method of Claim 22, wherein said partial hydrolysate of milk whey protein is mixed with said milk material in an amount of 2 to 20 wt% of said partial hydrolysate of milk whey protein, based on the total weight of said milk material.

28. (New) The method of Claim 22, wherein said partial hydrolysate of milk whey protein is mixed with said milk material in an amount of 5 to 10 wt% of said partial hydrolysate of milk whey protein, based on the total weight of said milk material.

29. (New) The method of Claim 22, wherein said partial hydrolysate of milk whey protein and said milk material are mixed in relative amounts of 2 to 1,600 parts by weight of said milk material and one part by weight of said partial hydrolysate of milk whey protein, based on the solid contents of said milk material and said partial hydrolysate of milk whey protein.

30. (New) The method of Claim 22, wherein said partial hydrolysate of milk whey protein and said milk material are mixed in relative amounts of 2 to 1,600 parts by weight of said milk material and one part by weight of said partial hydrolysate of milk whey protein, based on the solid contents of said milk material and said partial hydrolysate of milk whey protein.

31. (New) The method of Claim 22, wherein said partial hydrolysate of milk whey protein and said milk material are mixed in relative amounts of 4 to 640 parts by weight of the said milk material and one part by weight of said partial hydrolysate of milk whey protein, based on the solid contents of said milk material and said partial hydrolysate of milk whey protein.

32. (New) The method of Claim 22, wherein said mixing said partial hydrolysate of milk whey protein with said milk material is carried out by:

(a) adding said partial hydrolysate of milk whey protein to said milk material, to obtain an initial mixture; and

(b) maintaining said mixture at a temperature of 2 to 15°C for 5 to 24 hours.

33. (New) The method of Claim 32, wherein said initial mixture is maintained at a temperature of 2 to 15°C for 12 to 16 hours.

34. (New) The method of Claim 22, wherein said milk material is selected from the group consisting of whole milk, semi-skim milk, and skim milk.--